

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of

Authorizing Permissive Use of the “Next
Generation” Broadcast Television Standard

GN Docket No. 16-142

COMMENTS OF MICROSOFT CORPORATION

I. INTRODUCTION AND SUMMARY

Microsoft supports the Federal Communications Commission’s (“Commission’s” or “FCC’s”) efforts to expand the efficiency and intensity of use of the broadcast television bands. These bands have great potential as a focal point for low-frequency innovation and growth in the United States, both for broadcast and wireless services. For this reason, Microsoft is committed to advancing TV white-spaces technologies, and also appreciates the broadcasters’ efforts to modernize the nation’s over-the-air broadcast transmission format.

This transition is an important part of the FCC’s larger commitment to adopt policies that allow innovators and investors to produce more total utility from the country’s spectrum resources. In supporting the advance to ATSC 3.0, therefore, the Commission should adopt rules that advance overall efficiency of use of the band, should not undermine unlicensed wireless broadband, and should not improperly expand broadcasters’ spectrum rights. Careful review of any FCC decision to expand broadcasters’ spectrum rights is especially critical in the absence of any market mechanism to force broadcasters to internalize the economic costs of their exclusive

spectrum use. To achieve this goal, the Commission should: (1) adopt ATSC 3.0 simulcast rules that provide an adequate transition period for consumers without disrupting the post-Auction repack process; (2) not undermine wireless broadband by gifting broadcasters expanded exclusive spectrum rights that allow them to simulcast in shared TV white spaces; and (3) clarify that broadcasters must implement the ATSC 3.0 standard consistent with existing interference protections and not gain additional interference protections as a result of the ATSC 3.0 transition.

The rules the Commission adopts in this proceeding are likely to determine whether the band is used efficiently or inefficiently for a substantial period of time. ATSC 3.0 is not reverse compatible. This means that, for the foreseeable future, some viewers who rely on over-the-air signals (even if this is a small minority of viewers overall) will require ATSC 1.0 simulcasts, and broadcasters will continue to transmit in both formats.¹ So, if the Commission allows broadcasters to delay the repack or spread simulcast signals inefficiently across the band, its decision will undermine wireless broadband in both the 600 MHz and 700 MHz bands for far too long—and because FCC rules do not include a mechanism that requires broadcasters to internalize the cost of their spectrum use in simulcasting, the Commission cannot rely on market incentives to improve efficiency.

¹ Notably, broadcasters have made no commitment to cover substantially similar areas with the ATSC 1.0 simulcast as they do today. This means that fewer viewers will be able to receive over-the-air programming unless they purchase new televisions or converter boxes, neither of which are currently available. This outcome is inconsistent with broadcasters' prior Incentive Auction advocacy where they opposed any Commission action that might reduce their covered population by even a tiny amount. *See, e.g.*, Comments of the National Association of Broadcasters at 5, GN Docket No. 12-268 (filed Jan. 21, 2015) (asking the Commission to clarify that the inter-service interference limit for broadcasters in the Incentive Auction is “zero persons, rather than some fraction of the population that rounds to zero percent”). In fact, as the Commission is well aware, the National Association of Broadcasters went so far as to take the Commission to court claiming that its repack rules did not adequately preserve broadcast coverage. *See National Association of Broadcasters v. FCC*, 789 F.3d 165 (D.C. Cir. 2015).

The Commission has just completed the first ever Incentive Auction, and licensed and unlicensed broadband investors have made investments and other plans in reliance on a stable post-auction transition phase and rules consistent with the FCC’s long-standing commitment to promoting efficient spectrum use. The Commission should therefore consider the impact of its ATSC 3.0 rules on its larger economic goals across the critical 600 MHz and 700 MHz bands.

II. ATSC 3.0 SIMULCAST RULES SHOULD NOT DISRUPT THE POST-AUCTION REPACK PROCESS OR THE EMERGENCE OF WIRELESS BROADBAND.

The forward auction portion of the Incentive Auction closed on March 30, 2017, with bidders committing to pay a total of \$19.8 billion for 70 MHz of spectrum—including pledges by multiple bidders of more than \$1 billion each, and in some cases as much as \$6 and \$7 billion. These bids were placed in reliance on, among other things, the Commission’s commitment to complete the post-auction period within 39-months,² with some wireless licensees able to begin offering service well before the end of that window. The single largest bidder, T-Mobile, has announced that it expects to begin deploying in at least one cleared 600 MHz channel this year.³ LTE equipment for operations in this band is already available.⁴

The Commission should not allow the ATSC 3.0 transition to upset this settled framework. If not properly managed, assuming that it occurs before the end of the repack, the ATSC 3.0 transition has the potential to greatly complicate and delay the post-auction transition

² *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd. 6567 ¶ 525 (2014) (“Incentive Auction R&O”).

³ T-Mobile USA, Inc., *T-Mobile’s Spectrum Haul is a Game Changer for Wireless Consumers* (Apr. 13, 2017), <https://newsroom.t-mobile.com/news-and-blogs/tmobile-spectrum-auction-win.htm>.

⁴ *Id.*

by encouraging stations to change channels and shift their contours, which would in turn require new adjacent- and co-channel interference calculations and new sets of repack constraints. This is why the Commission decided that the broadcast band must be stable in order to facilitate this analysis and allow for an orderly post-auction transition.⁵

Facilitating a successful post-auction transition includes ensuring that stations do not take advantage of the process the Commission has provided for facility modification requests during the transition process in order to better position themselves for the ATSC 3.0 simulcast.⁶ The wireless bureau has already announced that it “does not intend to grant requests that would disrupt the transition”⁷ and requires stations seeking modifications to “specifically demonstrate that implementation would not interfere with other stations’ transition efforts.”⁸ This approach must persist if the Commission is to enable wireless broadband in this spectrum on either a licensed or unlicensed basis.

The Commission should affirm the continued applicability of these rules to stations seeking to initiate ATSC 3.0/1.0 simulcasts during the post-auction transition period. To permit such changes would invite substantial delay and new complexity in the post-auction transition process and essentially discard the channel reassignments the Commission has just announced.⁹ The post-auction transition and the ATSC 3.0 transition can proceed in parallel only if the Commission adheres to its prior commitments to freeze the band.

⁵ Incentive Auction R&O ¶ 205.

⁶ *Incentive Auction Task Force and Media Bureau Adopt a Post-Incentive Auction Transition Scheduling Plan*, Public Notice, DA 17-107, 2017 WL 400527, ¶¶ 47-53 (rel. Jan. 27, 2017).

⁷ *Id.* ¶ 50.

⁸ *Id.*

⁹ *Incentive Auction Closing and Channel Reassignment*, Public Notice, DA 17-314, 2017 WL 1364700 (rel. Apr. 13, 2017).

III. THE COMMISSION SHOULD NOT ALLOW SIMULCASTERS TO OCCUPY WHITE SPACES.

In considering ATSC 3.0 simulcast rules and the transition process, the Commission should not expand broadcasters' spectrum rights by allowing companies to claim white spaces for ATSC 1.0 or 3.0 simulcasts. Such a decision would offer no substantial economic, technical, or public interest benefit, but would be a significant setback for both licensed and unlicensed stakeholders in the Incentive Auction process, and slow the deployment of wireless broadband Internet access. It would also promote highly inefficient use of spectrum by encouraging broadcasters to use twice the bandwidth to transmit the same programming they transmit today, but in two different formats. In an era where other licensees and unlicensed stakeholders must compete fiercely for every megahertz, such a gift cannot be justified. In fact, it would be a step backward to an age when the FCC granted exclusive and valuable spectrum rights in a manner that did not require spectrum users to either internalize the costs of their spectrum use, or share the spectrum with others.

Fortunately, broadcasters have not asked for such special treatment, to their great credit. The broadcasters' petition only seeks authorization to simulcast an ATSC 1.0 signal on a DTV subchannel, within an existing 6 MHz allotment.¹⁰ Thus, according to broadcasters themselves, there is no need to expand the amount of spectrum broadcasters may occupy in order to achieve a successful transition to ATSC 3.0. Whatever the other benefits of the transition, therefore, there would evidently be virtually no benefit at all to allowing broadcasters to occupy vacant channels with ATSC 1.0 simulcast signals.

¹⁰ Joint Petition for Rulemaking of America's Public Television Stations, AWARN Alliance, Consumer Technology Association, and National Association of Broadcasters at 17-18, GN Docket No. 16-142 (filed Apr. 13, 2016).

But, on the other hand, it is clear that doing so would cause significant harm. As explained above, for example, allowing broadcasters to occupy white spaces would amount to adding a new station to the band in the middle of the post-auction transition. This is contrary to the Commission's freeze on the broadcast television band, and would introduce new co- and adjacent-channel interference constraints in the middle of the transition, adding complexity and inviting delay.

This would also exacerbate regulatory uncertainty facing unlicensed broadband innovators at the very moment companies need certainty about post-auction white-spaces availability to permit investment and planning. As we have explained, regulatory uncertainty has been the primary impediment to new investment in white-spaces technologies.¹¹ Uncertainty about the number of UHF white spaces that will be available after the Incentive Auction has been especially harmful because investors must know that sufficient spectrum will be available for personal/portable devices in major markets before they will make the necessary investments to support a truly thriving white-spaces ecosystem. Although white-spaces technologies have already connected communities around the country, with new projects currently underway,¹² the Incentive Auction and lack of finality on multiple important rulemakings have made investment far more difficult than it would have been in a stable regulatory environment.

The conclusion of the auction itself and the release of the Commission's Closing and Channel Reassignment PN was a major milestone in restoring predictability. The Commission

¹¹ See, e.g., Letter from Scott Harris, Counsel to Microsoft Corporation, to Marlene H. Dortch, Secretary, FCC, MB Docket No. 15-146 (filed July 29, 2015).

¹² See, e.g., Gigabit Libraries Network, "*Beyond the Walls*" Awards, <http://gigilibraries.net/Beyond-the-Walls>.

should not once again erode that certainty by permitting broadcasters to use white spaces as simulcast spectrum. On the contrary: it should clearly state that it will not do so.

IV. THE COMMISSION SHOULD CLARIFY THAT BROADCASTERS WILL NOT GAIN ADDITIONAL INTERFERENCE PROTECTIONS AS A RESULT OF THE ATSC 3.0 TRANSITION.

Under the minimal subset of ATSC 3.0 standards that the Commission has proposed to incorporate into its rules,¹³ ATSC A/321, a broadcaster would enjoy a great deal of flexibility in choosing the picture quality of its ATSC 3.0 signal, its range, and its robustness to interference. In fact, broadcasters could choose to offer a different type of service entirely, consistent with this small portion of the ATSC 3.0 standard. Broadcasters have also suggested that they may transmit broadcast signals using ‘single frequency networks,’ where multiple towers transmit the same signal on the same frequency at the same time.¹⁴ This flexibility may benefit broadcasters. But it also creates new, and seemingly unexamined, inconsistencies with the most basic aspects of the Commission’s broadcast television spectrum planning rules and policies. OET-69, for example, will likely need to be replaced with a new set of planning factors that somehow define broadcast signal contours in functional terms, rather than with reference to specific field strengths.

The Commission must make clear from the outset of this inquiry, however, that it will not grant broadcasters valuable new spectrum rights by protecting stations from interference beyond their existing noise-limited contours. Expanding interference protection—which broadcasters have not requested—would create numerous problems, including new interference situations between co- and adjacent-channel broadcasters, and between broadcasters and other services.

¹³ *Authorizing Permissive Use of the “Next Generation” Broadcast Television Standard*, Notice of Proposed Rulemaking, FCC 17-13, 2017 WL 735664, ¶ 5 (rel. Feb. 24, 2017).

¹⁴ *Id.* ¶¶ 59-62.

Broadcasters have requested that the Commission adopt only the ATSC A/321:2016 “System Discovery and Signaling.” This is only a tiny portion of the ATSC 3.0 standard which does not define the radiofrequency characteristics of the signal used to deliver any particular service. As the standard itself explains:

Broadcasters anticipate providing multiple wireless-based services, in addition to just broadcast television, in the future. Such services may be time-multiplexed together within a single RF channel. As a result, there exists a need to indicate, at a low level, the type or form of a signal that is being transmitted during a particular time period, so that a receiver can discover and identify the signal, which in turn indicates how to receive the services that are available via that signal.

To enable such discovery, a bootstrap signal can be used. This comparatively short signal precedes, in time, a longer transmitted signal that carries some form of data. New signal types, at least some of which have likely not yet even been conceived, could also be provided by a broadcaster and identified within a transmitted waveform through the use of a bootstrap signal associated with each particular time-multiplexed signal. Some future signal types indicated by a particular bootstrap signal may even be outside the scope of the ATSC.¹⁵

In other words, A/321 does not specify the radiofrequency parameters of an ATSC 3.0 signal. Rather, it specifies a means of *communicating* these parameters, which may depend on the service, the desired performance characteristics, or other considerations. Thus, broadcasters will be able to broadcast a variety of different types of signals—not just video¹⁶—and, for video signals, will be able to adjust the quality and interference robustness of the signal at any time.¹⁷

This means that the Commission’s traditional assumption that a broadcast coverage area can be identified with a particular signal-to-noise ratio will no longer be valid for ATSC 3.0

¹⁵ Advanced Television Systems Committee, *ATSC Standard: A/321, System Discovery and Signaling* § 1.1, Doc. A/321:2016 (Mar. 23, 2016), <http://atsc.org/wp-content/uploads/2016/03/A321-2016-System-Discovery-and-Signaling-1.pdf>.

¹⁶ *Id.*

¹⁷ *Id.*

signals. Although the field-strength limits in OET-69 may remain good approximations of the requirements for usable signal coverage for certain ATSC 3.0 video-transmission schemes, they may over-protect or under-protect others, depending on the broadcaster's choice. For example, a broadcaster may decide that the business case is stronger for an ultra-high-quality picture that can only be received at a high signal-to-noise ratio (maybe because the transmitter is centrally located in a densely populated, urban area). Such a signal might be unwatchable for viewers well within the protected contour defined by OET-69, yet the broadcaster would receive interference protection for its unusable signal. The Commission will need to fine tune its rules to avoid such inefficient outcomes.

Single-frequency networks ("SFNs") present similar challenges. An SFN would allow a broadcaster to fill gaps in its coverage by using another transmitter, transmitting an identical, synchronized signal. SFNs might serve a function similar to a translator station but, unlike translators, SFNs would allow fill-in coverage without using additional broadcast channels.

In theory, Microsoft supports this development, as it presents a more spectrally efficient way to fill in coverage gaps than existing translator stations. Indeed, the Commission should consider measures to encourage ATSC 3.0 broadcasters to avoid the use of translators altogether in favor of SFNs wherever possible. However, the Commission should also make sure that broadcasters are not allowed to use SFNs to expand their contours without Commission review and ample opportunity for public comment.

V. CONCLUSION

The ATSC 3.0 transition could provide a welcome modernization of the broadcast television band by affording greater spectral efficiency and flexibility for broadcasters. Moreover, the Commission can authorize ATSC 3.0 without harming other Incentive Auction and television band stakeholders. The Commission need only adhere to a single basic principle: it should grant broadcasters greater technical flexibility, but not allow these companies to expand their spectrum rights, or the geography over which they are allowed to exercise those rights. This will prevent new delays in the repack process and foster greater regulatory certainty for both licensees and unlicensed broadband interests, promoting investment and innovation, and protecting settled expectations.

Respectfully submitted,

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